

What is claimed:

1. A vector comprising from 5' to 3':
 - a) a packaging sequence;
 - b) a heterologous insert sequence or restriction sites for insertion of a heterologous sequence; and
 - c) a 3' long terminal repeat (LTR) sequence,wherein at least two codons of the packaging sequence are altered so as to reduce formation of fusion polypeptides encoded by the packaging sequence or a portion thereof, and the heterologous insert sequence.
2. The vector of claim 1, wherein at least two ATG codons of the packaging sequence have been altered.
3. The vector of claim 2, wherein the ATG initiation codon of the packaging sequence and at least one internal ATG codon of the packaging sequence have been altered.
4. The vector of claim 1, wherein the packaging sequence is a *gag* sequence.
5. The vector of claim 4, wherein the *gag* sequence is an amino-terminal portion of the *gag* gene.
6. The vector of claim 4, wherein the *gag* sequence comprises the nucleotide sequence of SEQ ID NO:2, or a portion thereof.
7. The vector of claim 3, wherein at least two internal ATG codons of the packaging sequence have been altered.
8. The vector of claim 3, wherein the internal codon which is altered is the codon at residues 1097-1099 of SEQ ID NO:1.

30 9. The vector of claim 3, wherein the internal codon which is altered is the codon
31 at residues 1589-1591 of SEQ ID NO:1.

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33 10. The vector of claim 3, wherein the internal codon at residues 1097-1099 and
34 the internal codon at residues 1589-1591 of SEQ ID NO:1 have been altered.

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36 11. The vector of claim 2, wherein one, two or all of the nucleotides of the ATG
37 codon(s) have been altered.

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39 12. The vector of claim 1, wherein the vector includes a heterologous insert
40 sequence.

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42 13. A vector comprising from 5' to 3':
43 a) a packaging sequence, wherein at least one ATG codon of the packaging sequence
44 has been altered;
45 b) a heterologous insert sequence or restriction sites for insertion of a heterologous
46 sequence; and
47 c) a 3' LTR sequence, wherein the 3' LTR comprises a proviral recovery sequence.

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49 14. The vector of claim 13, wherein at least two ATG codons of the packaging
50 sequence have been altered.

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52 15. The vector of claim 14, wherein the ATG initiation codon of the packaging
53 sequence and at least one internal ATG codon of the packaging sequence have been altered.

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55 16. The vector of claim 13, wherein the packaging sequence is a *gag* sequence.

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57 17. The vector of claim 16, wherein the *gag* sequence is an amino-terminal
58 portion of the *gag* gene.
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60 18. The vector of claim 14, wherein at least two internal ATG codons of the
61 packaging sequence have been altered.

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63 19. The vector of claim 14, wherein the internal codon which is altered is the
64 codon at residues 1097-1099 of SEQ ID NO:1.

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66 20. The vector of claim 14, wherein the internal codon which is altered is the
67 codon at residues 1589-1591 of SEQ ID NO:1.

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69 21. The vector of claim 14, wherein the internal codon at residues 1097-1099 and
70 the internal codon at residues 1589-1591 of SEQ ID NO:1 have been altered.

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72 22. The vector of claim 14, wherein all of the nucleotides of the ATG codon(s)
73 have been altered.

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75 23. The vector of claim 13, wherein the vector includes a heterologous insert
76 sequence.

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78 24. The viral vector of claim 13, further comprising a bacterial origin of
79 replication.

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81 25. The viral vector of claim 24, wherein at least a portion of the bacterial origin
82 of replication has been removed.

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84 26. The viral vector of claim 13, wherein the bacterial marker sequence is a
85 bleomycin marker sequence.

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87 27. The viral vector of claim 13, wherein the proviral recovery sequence is
88 located within a portion of the 3' LTR which duplicates upon integration.

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90 28. A vector comprising from 5' to 3':

91 a) a packaging sequence, wherein at least one ATG codon of the packaging sequence
92 has been altered;

93 b) a heterologous insert sequence or restriction sites for insertion of a heterologous
94 sequence;

95 c) a bacterial marker sequence, wherein the bacterial marker is less than 600 basepairs
96 in length; and

97 d) a 3' LTR sequence, wherein the 3' LTR comprises a proviral recovery sequence.
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99 29. A viral vector comprising:

- 100 a) a packaging sequence;
101 b) a heterologous insert sequence;
102 c) a bacterial marker sequence, wherein the bacterial marker sequence is less
103 than 600 basepairs in length;
104 d) a 3' LTR comprising a proviral recovery sequence,
105 wherein the vector comprises and can express a heterologous insert sequence
106 greater than about 8 kilobases in length.
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108 30. The viral vector of claim 29, wherein the packaging sequence is altered at an
109 initiation codon of the packaging sequence and at least one potential initiation codon of the
110 packaging sequence.
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112 31. The viral vector of claim 29, further comprising a bacterial origin of
113 replication.
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115 32. The viral vector of claim 31, wherein at least a portion of the bacterial origin
116 of replication has been removed.
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118 33. The viral vector of claim 29, wherein the bacterial marker sequence is a
119 bleomycin marker sequence.
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